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HAWAIIAN MONK SEAL WORK PLAN Fiscal Years 1991-93

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Southwest Fisheries Science Center
Administrative Report H-90-14

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Fiscal Years 1991-93

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INTRODUCTION

The "Hawaiian Monk Seal Work Plan" was developed to aid in planning, implementing, and budgeting the research and recovery activities directed at this endangered species by the Marine Mammals and Endangered Species Program (MMESP) of the Southwest Fisheries Science Center Honolulu Laboratory, National Marine Fisheries Service, NOAA. It was also developed in consideration of the priorities assigned to research and recovery tasks in the *Recovery Plan for the Hawaiian Monk Seal, Monachus schauinslandi* (Gilmartin 1983), the recommendations of the Hawaiian Monk Seal Recovery Team at its December 1989 meeting (Appendix A), and the recommendations of the Marine Mammal Commission following its review of MMESP activities in December 1989 (Appendix B).

Much of the work presented in this plan is a continuation of current MMESP activities, most of which are described in the listing of MMESP reports and publications (Appendix C). General descriptions of the various tasks are given; details of the work are not. The Hawaiian Monk Seal Recovery Team will meet each December to review research findings and make recommendations for future efforts; therefore, the research tasks indicated in this plan may change. However, the general pattern of research emphasis and priorities within this 1991-93 schedule is not expected to change as a result of the future program reviews of the recovery team.

The *Recovery Plan* (Gilmartin 1983) does not include a recovery goal for the Hawaiian monk seal population, but the recovery team will begin considering how to quantify this objective at its December 1990 meeting. However, based on current population status, none of the island populations west of French Frigate Shoals will approach the numbers of the 1950s within the time frame of this work plan. Therefore, the recovery goals will not affect the overall priority of the research contained in this plan.

The work plan addresses the three continuing, major concerns of the recovery team: 1) recovery of the western population (Kure Atoll, Midway Islands, and Pearl and Hermes Reef), 2) resolution of the mobbing problem at Laysan and Lisianski Islands, and 3) adequate monitoring of at least the five major breeding populations. All of the research and recovery tasks described below and included in this 3-year work plan contribute to further understanding, or resolution of, these identified problems and information needs. The recovery team members and MMESP staff have reviewed and contributed to this plan.

Research Task Descriptions

The tasks described below are scheduled in the work plan outline (Table 1). The numbers in parentheses following the

title of each task indicate the *Recovery Plan* (Gilmartin 1983) items which the task addresses. Actions that are not a number one priority may be included in these lists, but they are performed as time may allow, usually as part of a larger and higher priority field effort and with little or no additional cost.

A. Recovery of Western Population (Kure Atoll, Midway Islands, Pearl and Hermes Reef)

A.1. Head Start Project (*Recovery Plan* (Gilmartin 1983) actions addressed: 5.24, 5.29)

Female pups born at Kure Atoll are collected soon after weaning and placed in a large shoreline enclosure for protection from sharks and attacks by adult male monk seals. They are fed daily with live reef fishes and invertebrates collected locally and placed in the enclosure. The pups are weighed at monthly intervals, kept in the enclosure at least through the peak months (April-July) of potential injury, and then released at Kure Atoll in August or September. This program has been highly successful at increasing the young female survival rate.

A.2. Pup Rehabilitation-Release Project (*Recovery Plan*, (Gilmartin 1983) actions addressed: 1.11, 1.12, 5.26)

At French Frigate Shoals, small (<90 cm axillary girth) female pups with a low chance of survival are collected (usually in April-July) and transported to Honolulu for care and rehabilitation. In March or April of the following year, the yearlings in Honolulu that pass the screening tests for disease and genetic problems are returned to one of the Northwestern Hawaiian Islands (NWHI) breeding populations (historically, this has been Kure Atoll). At the release site, the yearlings are held in a shoreline enclosure for about 1 month for acclimation to the wild. During this holding time, the seals are exposed to live, locally collected reef fishes and must demonstrate their ability to forage for themselves before release. This program has experienced high survivorship of animals released at Kure Atoll. The recovery team has recommended the release site for these rehabilitated seals be changed to Midway Islands. This should be possible by 1992, as indicated in Table 1.

B. Mobbing Problem Research

B.1. Mobbing Research (*Recovery Plan* (Gilmartin 1983) actions addressed: 1.22, 1.4, 1.5, 3.13, 3.14, 3.24, 4.1, 5.29)

This task is guided generally by "A Plan to Address the Hawaiian Monk Seal Adult Male Mobbing Problem" (Gilmartin and Alcorn 1987). Research beginning in 1991 will include treatment of up to 50% of the adult male seals at Laysan Island with a drug

to suppress testosterone during the peak mobbing months. The plan also calls for collecting behavioral data, monitoring adult male aggression, and maintaining identification (e.g., tags or bleach marks) on all seals at Laysan Island. The priority of this research necessitates that field data relevant to this problem be analyzed, summarized, and reported as quickly as possible. This population will continue to be monitored for evidence of injuries and deaths due to mobbing attacks following the reversible treatments given in one or two breeding seasons and any other subsequent actions which may be taken to reduce female mortality.

Castration will be performed on captive adult males to evaluate the effect of this surgery on breeding behavior. This treatment may be pursued on wild adult seals if the experimental work indicates it will eliminate the aggressive behavior which results in high female mortality. The Hawaiian Monk Seal Recovery Team will be consulted in considering the options for a permanent solution to this problem.

B.2. Adult Tagging (*Recovery Plan* (Gilmartin 1983) actions addressed: 1.22, 1.5, 3.12, 3.21, 3.223, 3.225, 3.24)

Permanent marking of adult seals is essential to maintain identification in the mobbing research and is called for in Gilmartin and Alcorn (1987). This operation requires a minimum of five field staff at the tagging site, and therefore is not possible with the usual field camp contingent of two. Special plans must be made to have more personnel for a short period of time to conduct this work efficiently with minimal disturbance to the animals. Permanent marking of adult males can be performed at any time of year but is preferable outside of the breeding season to avoid affecting hauling patterns. Adult females will be tagged outside of the breeding season, in the fall or winter months. Tissue plugs are collected at the time of tagging and are used for DNA fingerprinting. The DNA work will enable positive identification of the breeding males--critical information to the success of the mobber drug treatment scheme described in task section B.1.

B.3. Assess Effects of Tagging Adult Females (*Recovery Plan* (Gilmartin 1983) actions addressed: 1.22, 1.5, 3.12, 3.24, 4.4)

Adult female monk seals have not been tagged by MMESP to date. Research will be conducted to evaluate potential disturbance effects on post-tagging hauling patterns of restrained and tagged adult females versus non-handled (scarred or bleached) females. The results of this research will enable knowledgeable decisions on the costs and benefits of adult female tagging and whether the effort should be expanded.

C. Population Monitoring

C.1. Island-Specific Monitoring (*Recovery Plan* (Gilmartin 1983) actions addressed: 1.11, 1.12, 1.21, 1.22, 1.23, 2.11, 2.15, 2.21, 2.32, 2.35, 3.11, 3.13, 3.14, 3.15, 3.2, 4.1, 4.3, 4.4, 5.18, 5.29)

This task requires 6-14 weeks of field time between mid-April and mid-August sufficient to 1) perform at least 10 complete beach censuses at all seal hauling sites at the island location at 2- to 3-day intervals and 2) flipper tag at least 75% of the pups of the year. The field time varies by island location, because personnel access to all the hauling sites depends largely on weather and sea conditions at the multi-island atolls, accessible only by small boat.

Pup tagging enables permanent identification of individual animals--information critical to monitoring age-, sex-, and island-specific patterns of survival, movement, reproduction, haul out, and behavior. These resighting data collected in the beach censuses also enable precise estimation of the size and sex composition of the population at a particular location. During such censuses, bleach-marking methods may be employed for clear individual identification.

Incidental to the above activities, this task accomplishes several other important functions: Deaths are documented and identified to probable cause, and necropsies are performed to develop further information on causes of mortality; injuries are documented and identified to probable cause, and healing monitored; beach debris capable of entangling seals is collected, sampled, and destroyed; seals found entangled are released; weaned pups are measured and weighed as a condition indicator and older immature seals are weighed and measured to allow estimation of growth rates; small tissue plugs are collected as part of the flipper-tagging procedure for DNA fingerprinting; and scat and spew samples are collected for prey species determination.

C.2. Weaned Pup Tagging Visit (*Recovery Plan* (Gilmartin 1983) actions addressed: 1.4, 1.5, 3.22, 3.23, 3.24)

Both sexes of pups are flipper tagged after weaning, and tissue plugs are collected for DNA fingerprinting. This operation is usually performed as a part of the island-specific monitoring task, but also may be accomplished separately during a short visit to a breeding population when a complete population monitoring effort is not scheduled for the location. Two or more people frequently patrol the island beaches for 1-3 days and tag and measure all weaned pups encountered. This tagging method is much less thorough than the long-term camps, because the prolonged pupping season and change in hauling patterns during

the first 3-5 months of life dictate that a high proportion of the pups will be missed in a short visit, regardless of time of year. Additionally, pup measurements will be of less value since weaning dates will be unknown. Nevertheless, this technique will increase the tagged yearling cohort at a specific site and subsequently augment survival, movement, and reproductive data. Additionally, the short visit allows a brief inspection of the population to check for possible die-offs or other unusual events that may be evident.

C.3. Immature Seal Tagging (*Recovery Plan* (Gilmartin 1983) actions addressed: 1.4, 3.223, 3.23, 3.24)

Primarily because of a reduced field effort in 1988 and 1989, there are many untagged young seals in some island populations. Double-flipper tagging of these seals will be accomplished, even though year and island of birth of the seals will be uncertain. This work may require additional staff or field time at some sites, especially Lisianski Island, because of the high number of untagged seals.

D. Data Analysis/Field Reports/Publications (*Recovery Plan* (Gilmartin 1983) actions addressed: 1-4, 5.22, 5.23, 5.24, 5.26, 5.29)

The proportion of total MMESP resources dedicated to this work has increased over the last 2 years (1989-90). This emphasis will continue through the 3-year work plan. Priority effort within this task through 1992 will be on analysis and reporting of data related to the mobbing problem, including portions of the population monitoring task. The NOAA Technical Memorandum will continue to be used as the vehicle to publish a full summary of the field camp findings. Scientific journal publications will be emphasized for highlights of the research findings and results of recovery activities.

RESEARCH AND RECOVERY ACTIVITY SCHEDULE AND WORK PRIORITY

Table 1 provides a schedule of the tasks in the 3-year (1991-92) work plan described above. The relative priority assigned to these tasks by the *Endangered and Threatened Species; Listing and Recovery Priority Guidelines* (U.S. National Marine Fisheries Service, in prep.) are all number one, based on MMESP evaluation. At its December 1989 meeting, the Hawaiian Monk Seal Recovery Team also gave all of this listed work a number one priority (Appendix A). The recommendations of the U.S. Marine Mammal Commission following its December 1989 review of MMESP monk seal research and recovery work reflect the same priority status for the tasks (Appendix B).

Field research and recovery actions are indicated for each of the five major breeding islands and Midway Islands in Table 1, which also provides the costs associated with performing the site-specific tasks. These costs include an estimated inflation rate of 5% per year. A "0" in a column indicates that the work will be performed at that location, but at no significant cost--usually because there are sufficient field staff available at the site for other tasks, and little time is required of them to accomplish the work. Costs for a specific field task vary by location because of local logistics of managing the work (i.e., small boat support required at some sites), the number of seals at the location, and whether other support (e.g., U.S. Coast Guard, U.S. Fish and Wildlife Service, U.S. Navy) is available.

The funding figures assume that the NOAA ship *Townsend Cromwell* is available at no cost to MMESP to provide logistical support for the field camps within the time frames required. Should ship or additional aircraft charters become necessary, additional funds will be required to complete the activities scheduled, or the charter funds will have to be taken from planned research tasks, thus reducing the level of field research or laboratory support effort.

The funding specified for the head start project at Kure Atoll includes the salary for only one of the two field staff required for the work. Over the last several years, MMESP has easily recruited volunteers for the second position. This staffing strategy will be used in the future, and the savings are reflected in the costs indicated in Table 1.

It is important to note that continuing to monitor these small populations is essential to the overall recovery effort. Only in this way can problems within the populations be detected and the effects of experimental recovery actions be assessed. In addition, the status, trend, and problems among the five major breeding populations are different, and therefore each must be carefully tracked to learn as much as possible about the dynamics of monk seal populations and what responses may be expected from future recovery actions and management strategies.

The recovery team recommended one other area of research that is slightly lower in priority than those scheduled in this work plan but, nevertheless, is very important to the overall recovery effort. Diving patterns and foraging efficiency of the populations at the main breeding locations should be determined. These data, together with the population biology information collected within the scheduled tasks of the work plan, should enable development of realistic population recovery goals.

CITATIONS

- Gilmartin, W. G. 1983. Recovery plan for the Hawaiian monk seal, *Monachus schauinslandi*. (Written by Gilmartin in cooperation with the Hawaiian Monk Seal Recovery Team.) Southwest Region, Natl. Mar. Fish. Serv., NOAA, 29 p. + tables, appendix.
- Gilmartin, W. G., and D. J. Alcorn. 1987. A plan to address the Hawaiian monk seal adult male "mobbing" problem. Southwest Fish. Sci. Cent. Honolulu Lab., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Southwest Fish. Cent. Admin. Rep. H-87-12, 24 p.
- U.S. National Marine Fisheries Service. In prep. Endangered and threatened species; listing and recovery priority guidelines. Docket No. 71015-0067. Protected Species Management Division, Office of Protected Resources and Habitat Programs, National Marine Fisheries Service, NOAA, Department of Commerce, 1335 East West Highway, Silver Spring, MD 20910.

Table 1.--Outline of the Hawaiian monk seal work plan and its associated costs, 1991-93.

Task	Recovery priority	Fiscal year	Program costs (US\$1,000)												
			Field site ^a					Total funds							
			FFS	LAY	LIS	P&H	MID	KUR	Data ^b	1991	1992	1993			
A. Western recovery	1	1991						22			10	32			
A.1. Head start		1992						23			11		34		
		1993						?			15			15	
A.2. Pup rehabilitation		1991	26					0			15	41			
		1992	27						13		21		61		
		1993	28						14		22			64	
B. Mobbing problem	1	1991		56							65	121			
B.1. Mobbing research		1992		50							42		92		
		1993		29	20						44			93	
B.2. Adult tagging		1991		45							14	59			
B.3. Assess tagging effects		1992							6		0		6		
		1993			39						0			39	
C. Population monitoring	1	1991													
C.1. Island-specific monitoring		1992													
		1993	35	18	18				16	110	197				
		1991													
		1992													
		1993	37	19	19	20	10	17	145			267			
		1991	39	20	20	21	8	18	150					276	
C.2. Pup tagging visit		1991				0	0				0				
		1992													
		1993													
C.3. Immature seal tagging		1991	0								0				
		1992				7	0				0	7			
		1993													
Grand total													450	467	487

^aFFS = French Frigate Shoals; LAY = Laysan Island; LIS = Lisianski Island; P&H = Pearl and Hermes Reef; MID = Midway Islands; KUR = Kure Atoll.

^bData analysis, reports, and program management.

APPENDIXES



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

Appendix A

February 26, 1990

SWC2:WGG

MEMORANDUM FOR: SWR - E. Charles Fullerton
FROM: SWC2 - William G. Gilmartin *William G. Gilmartin*
THROUGH: SWC2 - George W. Boehlert
SWC - Izadore Barrett
SUBJECT: Hawaiian Monk Seal Recovery Team Recommendations

The Hawaiian Monk Seal Recovery Team met in Monterey, California, 12-14 December 1989 to review the status of research and management activities directed at recovery of the monk seal population. The meeting agenda (Attachment A) included presentation of a summary of current activities and population status, and allowed time to discuss and recommend future actions and priorities.

At your request, I served as Acting Recovery Team Leader for this meeting and prepared the summary of recommendations (Attachment B). Certain of these recommendations are directed at the research program of the Marine Mammals and Endangered Species Program in Honolulu. These recommendations, as funding and logistics will allow, have been incorporated into the 1990 field plans and appropriate MMPA/ESA permits have been requested.

Some recommendations of the Recovery Team will require action by your office, including consultation with the Fish and Wildlife Service and the Coast Guard on specific issues. One item, related to review and approval processing of MMPA/ESA permit applications for monk seal work, should be transmitted to the NMFS Office of Protected Resources and Habitat Programs.

The most significant problem, identified in Attachment B, is inadequate funding for monk seal research and recovery actions. Although a work plan is being developed for the next three years, it will be impossible to consider it realistic if uncertainties in funding level continue.

cc: Hawaiian Monk Seal Recovery Team



Attachment A

HAWAIIAN MONK SEAL RECOVERY TEAM

MEETING AGENDA, DECEMBER 12-14, 1989

1. Introductory Comments
2. Status of Plan and Team Recommendations
3. Research Program Budget, Field Effort, Data Management, Publications
4. General Background Presentations and Discussions
 - a. Die-off Plan
 - b. Mobbing Plan
 - c. Energetics (R. Dunn)
 - d. DNA/chromosome (D. Duffield, M. Brown)
 - e. Injuries (L. Hiruki)
 - f. Population monitoring program (T. Johanos)
 - g. General survival patterns (T. Johanos)
 - h. Entanglement (J. Henderson)
 - i. Disease
 - j. Fostering (M. Craig)
 - k. Interisland movement (M. Craig)
 - l. Reproductive patterns (B. Becker)
 - m. Pupping sites
 - n. Audiogram
 - o. Captive seals (J. Henderson)
 - p. " " Care Committee (J. Henderson)
 - q. MMC program review 12/4-5 (B. Brownell)
 - r. Critical Habitat (G. Nitta)
 - s. FWS cooperation
5. Island Specific Presentations and Discussions of Research and Management Needs
 - a. Main Hawaiian Islands, other Pacific sightings (B. Gilmartin)
 - b. Nihoa/Necker (B. Gilmartin)
 - c. French Frigate Shoals (M. Craig)
 - d. Laysan, including mobbing work (B. Becker, B. Gilmartin)
 - e. Lisianski (T. Johanos)
 - f. Pearl and Hermes Reef (J. Henderson)
 - g. Midway (B. Gilmartin)
 - h. Kure, including HeadStart, rehab seals, Coast Guard (J. Henderson, B. Gilmartin)
6. Develop priority research and management needs listing
7. Team meeting frequency, membership additions or consultants, permit application review, communication with Captive Seal Committee, etc.
8. Draft recommendations for Regional Director

Attachment B

RECOMMENDATIONS
of the
HAWAIIAN MONK SEAL RECOVERY TEAM
on
RESEARCH AND MANAGEMENT ACTIONS DIRECTED AT RECOVERY
OF THE MONK SEAL

December 12-14, 1989

General Comments

The single most significant finding of the Hawaiian Monk Seal Recovery Team (Team), which was clearly apparent throughout the discussions on almost all issues, was the inadequate funding level of the research and recovery effort. Highly critical research necessary to resolve high priority problems is not being performed or is only progressing slowly due to lack of sufficient support. The Team was alarmed to find that even the ability to monitor the five major breeding populations has been compromised the last 2 years and that a full assessment will be impossible in 1990 as well. The collection and analysis of data on population structure and dynamics is critical to tracking the recovery progress in island populations which are being managed and increasing, and for assessing the urgency of intervention in populations which are depleted and not recovering or still declining. Each of the five major breeding populations is unique in status and problems and each must be monitored carefully. A mass die-off of seals, as occurred at Laysan Island in 1978, may now be preventable, but would not be detected and reported for treatment without observers on the island.

At its first meeting in 1980, the Team's primary concern was the highly depleted populations at the west end of the archipelago (Kure Atoll, Midway Islands, and Pearl and Hermes Reef). Even though the recovery effort at Kure Atoll is proceeding very well, there has not been a clear recovery response in the other two populations and the total number of seals in the west remains low. The Team continues to believe that population monitoring and continuation of recovery activities here is essential.

Understanding the cause of the adult male mobbing problem and developing a mechanism to reduce adult female mortality must receive urgent attention. At the present rate of female loss, the Laysan Island and probably Lisianski Island populations will continue to decline. Adequate funding to support research on this problem must be made available soon.

French Frigate Shoals (FFS) has the highest number of monk seals of all the breeding sites and produces 55-60% of the pups in the total population. This population grew rapidly between the 1950's and late 1970's and the mean girth of weaned pups is now significantly

smaller at FFS than at other breeding sites. The FFS population may be above the OSP level, but this particular site remains a concern because of the high proportion of the total population at FFS and because FFS may be supplying the females to maintain the Laysan and Lisianski Islands' populations.

Recovery Team/Advisory Group Meetings

- Team meetings should take place annually. December was selected as the best time, to allow for some analysis of the previous season's data and to allow lead time for planning of the following season's field activities.
- The membership of the Team should not be increased at this time, but certain individuals with expert professional training and experience related to certain research issues should be available to the Team in a consultant status with travel paid by the Regional Director.
- The Regional Director should make travel funds available for a subgroup of the Team and Team consultants, as deemed necessary, to meet to review and assist in planning certain aspects of the research program.
- Three suggested Team consultants, important to current issues were identified:

Sam H. Ridgway (veterinary medicine), Naval Ocean Systems Center, San Diego, CA 92152

Bill Lasley (reproductive physiology), School of Veterinary Medicine, UC Davis, Davis, CA 95616

D.G. Kleiman (reproductive behavior), Dep. of Zoological Research, National Zoological Park, Washington, DC 20008

- The consultant in veterinary medicine should also be a member of the Captive Monk Seal Review Committee.
- Team meetings should be held in Hawaii to facilitate the Team's access to data and consultation with Hawaiian monk seal field biologists.

Research Program Funding

- It was the unanimous finding of the Team that the level of funding that the Marine Mammals and Endangered Species Program (MMESP) has received for monk seal recovery tasks has been inadequate to support the amount of high priority research required to fully define the problems and develop solutions to allow recovery. NMFS must make funds available to the program to fully monitor all five major breeding populations annually,

to perform the mobbing research necessary to allow corrective action to be initiated at Laysan in 1991, and to continue the Head Start project and rehabilitated pup introductions to Kure Atoll.

- NMFS should find an acceptable mechanism to cultivate and receive funds and supplies from NGO's that may wish to support any aspect of the monk seal research or recovery work.

Data Analysis and Reports

- The adult male and female behavioral data related to mobbing that was collected in 1985 and 1988 should receive priority attention and analysis should be completed as soon as possible. The findings should be used to focus further behavioral observations in 1990 that may aid in understanding this problem.
- A popular article and a note for a scientific journal on the mobbing problem should be written and published soon. The science journal article should solicit comment on causes and solutions. Information on the problem should be forwarded to environmental groups for dissemination to their constituents.
- The Team recommended that the MMESP consider summarizing all annual islands' field data from each season into one publication as a possible means of reducing the effort required to complete this task.

Kure Head Start Project

- This project should be continued at Kure Atoll in 1990.
- In 1990, in addition to collection and maintenance of Kure born females and the introduction of rehabilitated females from French Frigate Shoals (FFS), five healthy (>100 cm girth) female pups should be collected at FFS, transported directly to Kure Atoll, and maintained in the Head Start enclosure along with the Kure pups for late summer release.
- At the Team meeting in December 1990, the Team will consider all of the Kure Atoll monk seal population data through 1990 in development of criteria for phase out of the Head Start project at that site.
- Collection of small pups at FFS for rehabilitation and release at the west end of the archipelago should continue.
- If, for any reason in 1990, transportation and release protocols for the rehabilitated pups cannot be managed at Kure Atoll, then they should be returned to French Frigate Shoals for release.

- Determine the size and sex composition of the adult monk seal population at Kure Atoll in 1990.
- The NMFS Regional Office should work with the Coast Guard to ensure that the present procedure of closing beaches with monk seal mother-pup pairs is incorporated into the written orders given to each Kure Loran Station Commanding Officer in the future.
- Weights and measurements of Kure Atoll pups should be monitored during their first summer post-weaning to assess rate of change of these condition indices.
- Prey species, identified from scats and spewings, of immature seals at Kure Atoll should be used to assess whether appropriate prey items are being introduced into the enclosure to feed the pups and yearlings.

Mobbing Problem

- The Team was concerned that the mobbing research plan was one year behind schedule due to insufficient funding. The Team believes this research is critical to recovery and that if mortality of adult females at Laysan Island continues at the present level, physical removal or a method of controlling this behavior of males must be initiated by 1992.
- All monk seals using Laysan Island must be permanently identified as soon as possible. Bleach marking should be attempted early in 1990, with permanent marks added as soon as possible. Adult females should be tagged in the fall of 1990, so as not to disrupt breeding, pupping, or nursing activities. Well-scarred females should be used as controls in a test of the effects of tagging.
- Experimental work with hormonal control of adult males should be continued and enhanced in 1990. Other approaches to identification of an experimental solution to the problem using a drug should be pursued in the event the current captive male monk seals do not show evidence of a normal testosterone cycle in 1990. These are:
 - a. Identify a captive breeding population of harbor seals where the drug being evaluated may be tested on one or more breeding males.
 - b. Collect blood samples from breeding males in the wild (Laysan and Kure) to determine whether serum testosterone concentrations in captive male monk seals are comparable to wild animals.

- c. Collect two subadult females for 1) captive maintenance with adult males to stimulate testosterone production for evaluation of testosterone cycle and testosterone suppression ability of test drugs, 2) determination of timing of estrus and evaluation of methods of identifying estrus in wild females, and 3) observations of mating behavior.
- Field research at Laysan Island in 1990 should be directed at selection of males for treatment in 1991 and identification of breeding seals that should not be treated. This effort should include DNA fingerprinting techniques to determine which males are breeding.
- One focus of research and data analysis should be on behavior and association patterns at about estrus in mobbed vs. non-mobbed females.
- The Recovery Team does not agree with the recommendation of the Marine Mammal Commission (Commission letter to J.E. Douglas, 12/11/89) that 5-10 immature female seals be collected at FFS and released at Laysan Island to test the feasibility of attempting to adjust the sex ratio by relocating females. The Team believes that the current research approach, as outlined in the mobbing plan (Gilmartin and Alcorn 1987), is appropriate, but underfunded.
- Continue to monitor injury patterns among the populations.
- Investigate whether mobbing-injured females may be assisted in recovery from injuries by administration of a drug.
- Investigate the feasibility of using a colored grease on adult seals to detect occurrence of mating with specific individuals.

Population Monitoring

- The Team believes each breeding population from FFS westward (including Midway) is unique with respect to monk seal population status and associated problems, and each is of critical concern. Each must be fully monitored on an annual basis at this time.
- In addition to continuation of the pup tagging effort, all immature seals found without tags should be tagged for future identification, even though island and year of birth for these seals will be unknown.
- As soon as funding and logistics permit, the Lisianski Island population should be fully defined by tagging all immature seals and by bleach marking all adults.

Midway Islands Recovery Actions

- Before any recovery actions (i.e., introduction of young seals) are initiated at Midway, a monk seal population assessment should be conducted and other activities undertaken to ensure high juvenile survival. These projects are:
 - a. Determine size and composition of the present Midway population by using bleach marking techniques and by tagging all immature seals.
 - b. Debris on Eastern Island beaches must be cleared. (FWS negotiate removal with the Navy.)
 - c. Monk seal prey species at the atoll should be surveyed for ciguatoxin. (Team considered this a FWS Refuge task.)
 - d. NMFS and FWS resources must be available to monitor the population following any seal introductions.
- Identify preferred pupping beaches at Midway, as may be possible, from the historical data. Determine how present debris distribution and human beach use may affect recovery at this site.
- Permanently mark all Midway seals on an opportunistic basis.
- The FWS should assist in monitoring the Midway Islands population.

Tern Island Management

- The Team strongly recommends that the FWS take the course of action identified as "Option 3 - A 10 to 20 year plan" in Evaluation of U.S. Fish and Wildlife Service Operations on Tern Island in the Hawaiian Islands National Wildlife Refuge: Recommendation for a Long-term Course of Action (D. A. Vogel 1989) as the future management strategy for Tern Island.

MMPA/ESA Permits

- The Team agrees with the Marine Mammal Commission recommendation that permit applications for endangered and threatened species receive highest priority attention in the NMFS Permit Office.
- Most of the Recovery Team recommendations in this memorandum will require action in the 1990 field season. It is critical that appropriate permits to perform this work be issued in time.

Defining "Recovered"

- Because of insufficient time at this meeting and its relative low priority compared to other issues, the Team postponed discussion of this topic to the next meeting.
- The Team did agree that certain research would be important in later consideration of criteria to define recovery for the monk seal, if this research can be managed without compromising higher priority research. These projects are:
 - a. Development of growth rate data from the main breeding populations by weighing and/or measuring known age seals. (This should include experimental work in remote sizing of the seals to allow future monitoring without disturbance.)
 - b. Development of information of foraging efficiency, diving patterns, and prey species among the main breeding islands.

FY-1990 Field Work Priorities

- Considering the necessity of population dynamics monitoring at the main breeding islands, the continuing critical need to build the monk seal population at the west end of the range, and the urgency of resolving the mobbing problem, the following list (in order of priority) for 1990 field work was recommended:
 - a. Kure Atoll - Head Start, female seal introductions, population monitoring.
 - b. Laysan Island - Mobbing study, population monitoring, apply permanent marks to entire population.
 - c. French Frigate Shoals - Population monitoring, collect pups for rehabilitation.
 - d. Lisianski Island - Mobbing study, population monitoring.
 - e. Pearl and Hermes Reef - Population monitoring.
 - f. Midway Islands - Population status assessment.
- Continue beach debris cleanup at all breeding islands, as extensively as logistics may allow.
- Consult with the FWS on methods to reduce disturbance to monk seals at FFS while monitoring turtle nesting activity.
- Continue to evaluate permanent marking methods for monk seals.

Disposition of Recommendations

These recommendations, originating at the Hawaiian Monk Seal Recovery Team meeting in Monterey, CA, 12-14 December 1989, should be appended to the Recovery Plan for the Hawaiian Monk Seal (1983). The Recovery Plan continues to be a good general guide to overall recovery needs and the Team sees no cause at this time to revise the Plan.

MARINE MAMMAL COMMISSION

1625 EYE STREET, N.W.
WASHINGTON, DC 20006

Appendix B

11 December 1989

The Honorable James E. Douglas, Jr.
Acting Assistant Administrator for Fisheries
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Washington, D.C.

Dear Mr. Douglas:

On 4 and 5 December 1989, the Marine Mammal Commission conducted a review of the National Marine Fisheries Service's Hawaiian Monk Seal Program. The agenda is attached (Attachment A), and this letter generally follows that agenda.

The record of the Hawaiian Monk Seal Program is one of progress in adversity. From the outset, the program, designed to encourage the recovery of a critically endangered species, has not received the necessary support from its parent agency; instead, it has had to rely upon the good will of Congress and the generous, but unpredictable, contributions of other agencies, organizations, and committed volunteers. The program staff is to be commended for all it has accomplished and to be helped in doing more. The purpose of this review, however, was not to focus upon achievements; it was to describe weaknesses so that, with the reconvening of the Hawaiian Monk Seal Recovery Team, prompt and decisive actions could be taken by that group and the Service itself. While this letter therefore appears critical, one should view it within the context of much having been accomplished already to protect and encourage the recovery of this species. The staff, the volunteers, and the contributing agencies and organizations are to be commended for their respective roles in realizing this progress.

Recovery Plan and Recovery Team

The Hawaiian Monk Seal Recovery Team last met in December 1984. Since then, the Marine Mammal Commission has repeatedly recommended that it meet again. The Recovery Team is to meet 12-14 December 1989. The delay in the Service's reconvening of the Recovery Team is inexcusable.

With respect to that meeting, the Marine Mammal Commission recommends that the National Marine Fisheries Service: direct the Recovery Team to update the Recovery Plan by 1 March 1990;

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direct the Recovery Team to develop a Comprehensive Work Plan to implement the revised Recovery Plan by the end of March 1990 or as soon thereafter as possible; direct the Recovery Team to re-evaluate its terms of reference to see if they allow it sufficient latitude to meaningfully advise upon and influence the program; within thirty days, augment Recovery Team membership by adding an experienced marine mammal veterinarian and a marine mammal physiologist; and publish by 15 January 1990 a schedule of annual Recovery Team meetings for the next four years. The Marine Mammal Commission further recommends that the Service appoint as Chairman of the Recovery Team someone who, while familiar with the Hawaiian monk seal, is not directly involved in the management of the program. This will help to clearly separate program management and advisory roles, and it will provide the Project Leader additional time to devote directly to program management.

The Monk Seal Recovery Plan, which has not been revised since 1983, sets forth as objectives the following: 1) to identify and, where possible, mitigate the natural factors causing or contributing to the decreased survival and productivity of monk seals; 2) to characterize the marine and terrestrial habitat requirements of the Hawaiian monk seal, including use patterns and feeding habits; 3) to assess the monk seal population and monitor population trends; 4) to document and, where possible, mitigate the direct and indirect effects of human activities on monk seals; 5) to implement appropriate management actions leading to conservation and recovery of the species; and 6) to develop an educational program to foster greater conservation efforts among the users of the northwestern Hawaiian Islands and the public. The tasks described to meet those objectives would, if completed, provide: an evaluation of the status of the monk seal population; a description of factors contributing to its decline; an evaluation of its habitat requirements and the availability of prey species; information on the natural history and reproductive biology of the species; and information on which to base management actions to mitigate detrimental impacts on the seals.

In the Recovery Plan, tasks are assigned priorities -- priority 1 being those actions viewed as most critical to the species' survival and recovery. Not all priority 1 research tasks and few of the priority 2 and 3 research tasks identified in the original Plan have been carried out. While inadequate support is the primary reason that it has not been possible to do more, the result has nonetheless been an overall decline in the amount of research done and growing quantities of unanalyzed and unreported data.

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For these reasons, major objectives of the forthcoming Hawaiian Monk Seal Recovery Team meeting should be to evaluate progress since March 1983 in both the research and management areas against the established objectives, establish new objectives, examine present needs in both areas, and assign priorities to tasks designed to meet those objectives. In doing this, the Team should carefully address the issues of unanalyzed and unreported data and the plans which the Service has made to remedy those deficiencies.

The Team should also examine the underlying rationale of some of the studies which have been undertaken and the reporting of others. One sees, for example, behavioral studies in which conclusions based on initial observations are put forth without appropriate testing of the underlying hypotheses, stated findings which are not in fact conclusive, and the reporting of basic data that has not been synthesized or substantively discussed.

Research Program

The monk seal research program has suffered from a number of problems which have hindered some research activities and prevented the implementation of others. This appears to result from one or more of the following: inadequate outside review of the program; a lack of timely, systematic analysis of collected data; limited publication of results, particularly in peer reviewed journals; a relatively high turnover in program personnel; and funding limitations which preclude hiring adequate numbers of formally trained personnel to do the necessary field and analytic work.

Program priorities must be re-examined by the Recovery Team in an effort to describe ways in which the most critical work can be done even with limited funding. For example, budgetary restraints over the years have led to decisions to limit some activities in order to maintain a "basic" research effort. These trade-offs have included the length of each field season, the number of field sites occupied, the number of visits to each site, the number and quality of personnel, and the analysis and reporting of research findings. Without the continuation of adequate field research, monitoring the status of the population and related tasks will continue to suffer, and, without the continued input of new data from the field studies and the prompt analysis of existing data, it will be difficult (if not impossible) to identify critical gaps in the research program and to formulate recommendations for management actions to promote the recovery and conservation of this species.

A great deal of work has been done to mitigate pup mortality, increase the numbers of breeding females in the population, prevent seals from abandoning islands as a result of human disturbance, and increase our understanding of the biology, natural history, and needs of monk seals. However, the concomitant increase in the responsibilities and duties of the Project Leader and limitations in staffing and operational support, have delayed, and in some cases, prevented the timely reduction and analysis of field data. This has resulted in an unacceptably large backlog of data which awaits analysis and reporting. Thus, subsequent field work has been undertaken without the benefit of the findings of previous seasons. The Marine Mammal Commission recommends that the Service address these deficiencies immediately to insure that the necessary reduction and analysis of field data and the reporting and publication of results are carried out in a timely fashion.

An indication of the weakness of the scientific organization of the monk seal program is the approach to studying, understanding, and mitigating the male mobbing problem which results in the loss of breeding females. The present approach is to test whether treatment with drugs will reduce the male drive to compete for females with resultant injury and sometimes death. Administration of the drug has proceeded without background investigations on normal male hormone levels or cycle (if such exist in this species), monk seal physiology, or whether nonspecific social interactions, the presence of estrus females, or other conditions are involved in triggering the mobbing response. Conclusions that the problem has been adequately defined have been based on initial observations without the benefit of hypothesis formulation and testing with systematically collected data from captive and wild seals (i.e., without scientific method). In part, this has been because the data necessary to test behavior questions have not been systematically collected, or, if they have been collected, they have not been analyzed. The Marine Mammal Commission recommends that the Recovery Team and program staff consult with specialists in scientific program design for recommendations on this and other program tasks, and that, with respect to mobbing, program staff seek further outside, expert advice on how to implement the recommendations of the 1987 mobbing workshop.

The Commission believes that certain research and management areas need to be pursued if the primary objectives set forth in the Hawaiian Monk Seal Recovery Plan are to be attained (See Appendix B). To do this, the Service also needs to develop a funding base which recognizes the necessities of obtaining

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information over sufficient time to provide for long-term trend analysis, and of substantially diminishing the budgetary uncertainties which force the program to rely upon the charity of other agencies, organizations, and individuals. In addition to listing primary research and management tasks, Attachment B also identifies tasks which the Commission feels could best be undertaken by the monk seal program staff, those which could best be done under outside contract, and those requiring a collaborative effort between program staff and outside contractors.

Research Task Comments

Male Seal Mobbing: Because the aggressive behavior of males causes injury and mortality in breeding females, the cause of this behavior and how it may best be prevented need to be determined. The Marine Mammal Commission recommends that, as a first step, the preliminary behavioral studies necessary to identify the cause of this phenomenon be undertaken, and that these include: identification of which age class(es) of individual male seals are the principal participants in mobbing; identification of offending individuals responsible for the mobbing behavior; and, if possible, identification of principal breeding animals. (See, for example, K.R. Richard and Whitehead, H., page 55, Abstracts from the Eighth Biennial Conference of the Marine Mammal Society). These findings should form the basis for developing suitable management actions to mitigate the loss of breeding females as the result of this behavior.

The Marine Mammal Commission recommends that the Service seek the advice of the Hawaiian Monk Seal Recovery Team on actions to address the male mobbing problem including consideration of the appropriateness of high risk experimental programs to explore manipulating the sex ratio of seals by relocating 5-10 female seals to mobbing beaches from other areas.

The Head-Start Program: The head start pup recovery program has proven to be one of the most successful aspects of the monk seal recovery effort because it contributes female seals with breeding potential to the population. It should be continued and expansion of the program to Midway Island should be considered.

Reclamation of Tern Island, French Frigate Shoals: The deteriorating seawall and the debris at Tern Island pose direct threats to seals and sea turtles that become entrapped and to the integrity of the Island itself. As a matter of highest priority, repair of the sea wall and removal of debris from all of the areas used by monk seals must be immediately undertaken.

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Furthermore, fuel still stored on the Island from World War II must be removed to prevent its leakage into habitat which is critical not only to monk seals, but to endangered sea turtles and a variety of sea birds as well. The Marine Mammal Commission recommends that the Service, in cooperation with the Fish and Wildlife Service, the U.S. Navy, and the U.S. Coast Guard, mount a program to rebuild the Tern Island seawall and develop a program to locate and remove fuel from abandoned World War II storage facilities. The Marine Mammal Commission further recommends the immediate establishment of a schedule of interagency consultations on this issue. While lead responsibility rests with the Fish and Wildlife Service, determined participation on the part of the National Marine Fisheries Service will be essential.

Population Monitoring: Efforts to monitor the status and trends in the monk seal population throughout its range are an essential part of the Recovery Plan which cannot be compromised. The analysis of monk seal population trends and related studies relies on there being a time series of information of sufficient length to detect significant trends. To date, this has been one of the strongest aspects of the monk seal recovery effort, but recent budgetary constraints have reduced population studies in some areas and entirely prevented their continuation in others. Annual census efforts should be continued each season until the population has recovered to some level within the optimum sustainable population limits throughout its range. Once at this level, reduced monitoring efforts could probably be implemented. The Marine Mammal Commission recommends that the Service develop funding support adequate to insure the continuation of at least the minimum level of population monitoring necessary to maintain meaningful population trend analyses.

A related issue involves the development of alternative census techniques, including DNA fingerprinting. One such approach uses mark-and-recapture theory. The monk seal population is small enough and a sufficient number of pup cohorts have been tagged during recent years to allow comparison of the traditional census procedure with estimates derived from resightings of tagged animals. Such an exercise could allow the comparison and validation of estimates derived from counts with estimates derived from mark-and-recapture methods, and provide the opportunity to explore an alternative approach for obtaining an "index" of abundance that requires less survey effort than is currently required.

At Sea Behavior: To evaluate the availability of resources and better understand the monk seals' reliance upon those

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resources, investigations of the seals' feeding habits and habitat use should be restructured and expanded to take advantage of new technology and instrumentation now available for remote sensing of animal behavior and environmental factors (e.g., depth of dive sensors, VHF and satellite radio transmitters, etc.). The Marine Mammal Commission recommends that the Service seek the advice of the Recovery Team on methods to investigate, among others, such areas as "at sea" behavior and movements; length and range of the seals' foraging trips; and energetic studies designed to evaluate foraging behavior.

Data-base Compilation, Management, and Analysis: The Commission was pleased to learn that information on life history and population status obtained in previous years was being compiled and analyzed. In providing a comprehensive look at the information that has been obtained throughout the program, this exercise should also identify gaps in the data-base that could be filled with directed research efforts in the future. The Marine Mammal Commission encourages the design and implementation of a computerized system for information archiving, updating, and analysis. A Geographic Information System might be particularly helpful. In this regard, the Commission feels that the program staff should be augmented to include a full-time data manager to set up a computerized monk seal data-base analysis system and to oversee the ongoing process of data acquisition and analysis.

Population Simulation and Modeling: Once the data-base has been assembled and organized, efforts should be undertaken immediately to produce a status overview of the monk seal population based on the life history information. Values for age-specific life history parameters should be developed and evaluated to provide input for management decisions. One approach to this process would be to develop a population model for the Hawaiian monk seal similar to that developed for sea otters (Eberhardt and Siniff 1988), for gray whales (Reilly et al. 1981), etc. These models couple empirical data and population dynamic theory to generate estimates of population size over time. The model may then be used to produce population projections and conduct sensitivity analyses and simulations. These can be used to help evaluate either the effects of alternate management strategies or the impacts of random disasters (e.g., oil spills, disease die-offs, etc.), and to identify critical data gaps in the life history of the species. The Marine Mammal Commission recommends the development of such a population model for monk seals as a cooperative effort among program staff and other scientists expert in the field of biological modeling and simulation.

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Permits

With respect to authorizations to conduct work under permit, greater attention needs to be paid to permit compliance and the processing of permits.

With respect to compliance, the Marine Mammal Commission recommends that: all program personnel carry copies of issued permits with them into the field; that they be provided such additional written and verbal guidance as may be necessary on precisely what activities are permitted; that they be fully versed in the need for minimizing any disturbance to the monk seals; and that they understand that no activities, which are not specifically authorized, may be undertaken. The Marine Mammal Commission further recommends that the Service, in consultation with the Recovery Team, plan to seek permits under the recently described Marine Mammal Protection Act "enhancement" authority when it becomes appropriate to do so.

With respect to the processing of permits, the Marine Mammal Commission recommends that permits for work on Hawaiian monk seals and other endangered, threatened, or depleted species be afforded highest priority by the National Marine Fisheries Service's Permit Office.

Animal Care Committee

The Animal Care Committee, as presently constituted and trained, is not qualified to provide the rigorous overview necessary to insure that the monk seals are afforded the best possible care and maintenance and that record-keeping is acceptable. The Committee cannot, without additional help, meet its obligations to: "establish written guidelines for care, maintenance, and record keeping of captive Hawaiian monk seals;" "review pertinent laws and regulations pertaining to marine mammal care in captivity," a charge which would be better worded "review, understand, and insure the proper application of relevant laws and regulations pertaining to marine mammal care in captivity;" "examine holding facilities to ensure compliance with terms of Animal Welfare Act;" "review past necropsy reports;" "review experimental protocols on captive seals to ensure compliance with pertinent laws and permits;" "develop standard operating procedures in the event of illness or death, to include investigations of pathology and future necropsy procedures," a charge which would be better worded "develop standard operating procedures related to health and disease; in the case of death, a

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complete standard necropsy must be prepared describing the events leading to death, the findings of gross, histopathological, microbiological, virological, toxicological, and other indicated examinations, and the cause(s) of death;" "review records and evaluate performance of each facility;" "establish procedures for screening seals that will be returned to the wild;" and "make appropriate recommendations relative to the above items to the Director, Honolulu laboratory."

The Marine Mammal Commission recommends that the membership of the Animal Care Committee be broadened to include an experienced marine mammal veterinary scientist who is versed in animal care committee responsibilities and an interested member of the public; further, the Marine Mammal Commission recommends that the Animal and Plant Health Inspection Service and outside consultants be asked by the Service to provide a training program in January of 1990 for the Hawaiian monk seal program staff, appropriate Sea Life Park staff, appropriate Waikiki Aquarium staff, consulting veterinarians to the program, and the Animal and Plant Health Inspection Service veterinarians resident in Hawaii.

An important function of many animal care committees is to provide a body to which concerns about the care, maintenance, handling, and health of animals can be addressed in confidence. This has proven a valuable and effective mechanism for addressing problems elsewhere. The Marine Mammal Commission therefore recommends that appropriate steps be taken to make the good offices of the Animal Care Committee available to those who may have concerns relating to the welfare of both captive and wild monk seals and that responsibility be assigned to the Committee to fully examine any matters placed before it.

These comments should in no way be construed to indicate a lack of confidence in the concept of animal care committees. On the contrary, the Commission believes that the Service has made a good start and that an adequately staffed and trained Animal Care Committee can exert a beneficial influence not only on captive holding but on field activities as well.

Facilities/Nutrition

Inspections of the Kewalo Basin facility, the Waikiki Aquarium, and Sea Life Park indicate that better facilities, particularly with respect to one's ability to isolate animals, are needed. There is also a need for further training in facilities maintenance and nutrition (e.g., the quality and nutritional value of the food, storage, preparation, and accurate

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recording of amounts consumed) which can be addressed both through the inclusion of an experienced marine mammal veterinarian on the Animal Care Committee and the January training program. With respect to the facilities, the Marine Mammal Commission recommends that the former holding facility at Kewalo Basin not be used for any marine mammals unless it is first razed and completely rebuilt.

Veterinary Care

The Marine Mammal Commission recommends that: (1) all necessary protocols related to animal care, including one for reintroduction of animals to the wild, be developed as soon as possible, preferably before the January training program is held; (2) that necropsies be performed by a veterinarian who is experienced with marine mammals and, who is also, whenever possible, a board certified pathologist; and, (3) that arrangements be made with a laboratory of known quality such as the Fish and Wildlife Service's Laboratory in Madison, Wisconsin to promptly work up specimen material on a routine basis. Because of the inadequacy of the necropsy reports on the five pups that recently died, much knowledge that might have been of critical value in the recovery process has been lost forever.

Personnel

With respect to the analysis of data already collected but not yet analyzed, the Commission is pleased that the Service intends to hire a Ph.D. biometrician by March of 1990. In this regard, meeting discussions also made clear the need for a full time data manager to process data. With respect to administrative assistance, the Project Leader could work more efficiently and effectively if administrative burdens were diminished by the addition of an administrative assistant. This would, among other things, provide additional time for the project leader and other senior staff to rigorously manage contract studies. Therefore, the Marine Mammal Commission recommends that every effort be made to fill these three positions as expeditiously as possible and that appropriate changes in the current budget be sought to accomplish this.

Funding

The single most important factor in this program's success to date has been the commitment of those involved to encouraging the recovery of the Hawaiian monk seal. Much of what has been accomplished, however, has been at great personal cost to those involved in the program. Furthermore, the program has come to

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rely far too much upon the good will of other agencies, non-governmental organizations, and a great many volunteers to meet its objectives. As a result, the program has suffered; it has operated in an atmosphere of constant budgetary uncertainty which has precluded planning and carrying out an organized program of field work, captive studies, other related projects, and reporting and publication. Inadequate funding adversely affects program continuity and productivity; it also threatens the continuation of important program elements already in place like studies of population abundance, population monitoring, and behavioral studies based on resightings of previously tagged cohorts of animals. The Service must recognize this crippling weakness and commit itself to address the plight of this endangered species by providing adequate support. This will never be accomplished if well-reasoned requests for funding are not made and brought forward. Therefore, the Marine Mammal Commission recommends that the Service promptly develop, in consultation with the Recovery Team and with reference to the Comprehensive Work Plan, a well documented three-year budget that provides for support of the Hawaiian monk seal program at a level sufficient to allow an organized and rational approach to all issues.

Program Oversight

Progress has been made this year in reorganizing the program, redefining responsibilities, and clarifying roles. To be successful, this process should be extended. Believing that much stands to be gained from a further clarification of roles, the Marine Mammal Commission recommends that the Service undertake immediate and intensive evaluations of relationships among key Service personnel, key program personnel, the Hawaiian Monk Seal Recovery Team, and the Animal Care Committee to describe the activities of each in such a way as to insure the efficient and effective functioning of the program as a whole and adequate oversight and supervision at all levels.

Sincerely,



John R. Twiss, Jr.
Executive Director

Attachments

cc: The Honorable John F. Turner

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APPENDIX A

Agenda Hawaiian Monk Seal Program Review 4-5 December 1989

I. Introduction

II. Recovery Plan and Recovery Team

- A. Status of Recovery Plan
- B. Schedule for updating Recovery Plan
- C. Terms of Reference for Recovery Team
- D. Recovery Team Membership
- E. Schedule of Recovery Team Meetings
- F. Possible changes to strengthen Recovery Team

III. Management Activities and Priorities

- A. Kure Atoll Head Start Program
 - a. Objectives, methodology, and results
 - b. Plans for continuation/application to other areas (e.g., Midway)
- B. Recovery, Rehabilitation, and Release of Emaciated Pups
 - a. Objectives, methodology, and results
 - b. Plans for continuation
- C. Coast Guard Activities at Kure Atoll
 - a. Coast Guard cooperation regarding beach use
 - b. Long-range plans for abandonment of Kure
- D. Cooperation with the Fish and Wildlife Service
 - a. Cooperative research activities
 - b. Cooperation with logistic support
 - c. FWS activities/plans at Midway
- E. Status of Plans for Tern Island
 - a. Results of FWS options review
 - b. Needed actions

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- F. Seal Entanglement and Debris Clean-up
 - a. Objectives, methodology, recent results
 - b. Plans for continuation
- G. Fishery Interactions
 - a. Status of fishing activities in monk seal habitat
 - b. New MMPA reporting requirements (any further research or management actions needed?)
- H. Critical Habitat Identification, Designation, and Protection
 - a. Actions taken and contemplated (including § 7 consultations)
 - b. Problems encountered
 - c. Additional research or management requirements

IV. Research Activities and Priorities

- A. Population Status and Trends
 - a. Objectives, methodology, and results
 - b. Status of data analysis
 - c. Population trends
 - d. Future research needs and plans
- B. Feeding Activities and Habitat Use-Patterns (including depth-of-dive research)
 - a. Objectives, methodology, and results
 - b. Status of data analysis and future research plans
- C. The Male Mobbing Problem
 - a. Objectives, methodology and results
 - b. Status of data analysis and future research plans
- D. Other Research Activities
 - a. Other field research and sampling activities
 - b. Other laboratory research (including research on captive animals)
 - c. Status of die-off response plan
- E. Summary of Research Needs and Priorities

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V. Monk Seal Program Administration and Oversight

A. MMPA and ESA Permit Requirements

- a. Existing permit authorizations
- b. Permit applications in process
- c. Future permits needs
- d. Instructions to field personnel on permit compliance
- e. Plans for use of new MMPA enhancement authority

B. Animal Care Committee

- a. Terms of reference
- b. Membership
- c. Schedule of meetings
- d. Actions taken to date by Committee
- e. Possible changes to strengthen Committee

C. Facilities/Nutrition

- a. Adequacy of APHIS inspections
- b. Discussion of recent inspections
- c. Practices with respect to staff training in facilities care and maintenance
- d. Adequacy of holding facilities
- e. Protocols governing water quality
- f. Protocols governing food quality and preparation
- g. Record keeping

D. Veterinary Care

- a. Veterinarians on staff or under contract
- b. Veterinary oversight of captive and field activities
- c. Protocols governing nutrition, disease prevention, re-introduction of disease-free animals to the wild, parasite control, euthanasia, and veterinary care
- d. Adequacy of necropsy reports (including lab workups)
- e. Record keeping

E. Staffing

- a. Present staffing
- b. Schedule for hiring new biometrician
- c. Field staff selection
- d. Field staff training
- e. Oversight of field activities
- f. Staffing needs

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F. Funding

G. Program Oversight

- a. Project leader
- b. Animal Care Committee
- c. Recovery Team
- d. Marine Mammal Commission

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APPENDIX B

SUGGESTIONS FOR CONSIDERATION BY THE MONK SEAL RECOVERY TEAM

Task Assignment Codes

M = Management Activity S = In-house Staff Study
 R = Research Activity C = Contract Study

1. Identification and mitigation of those factors causing or contributing to decreased survival and productivity.
 - R S/C 1.1 Male mobbing program: determine the cause of the problem and how it might best be prevented.
 - M S 1.2 Kure head start pup recovery program (i.e., head start and recovery and rehabilitation of pups): continue and consider expanding the program to Midway Island.
 - M S 1.3 Tern Island: take necessary actions to force repair of the sea wall and removal of debris from all of the areas used by monk seals and sea turtles.
 - M S 1.4 Habitat clean up or the removal of debris from beaches and areas utilized by monk seals.
2. Population monitoring and life history studies.
 - M S 2.1 Annual census and pup counts of all monk seal groups.
 - R C/S 2.2 Behavior Studies including: breeding behavior (including mobbing) and mating system, interspecific relationships, and mother/pup relations (e.g., focal animal behavior studies of known individuals recognized by either natural markings or artificial tags or marks).
 - R C 2.3 Genetic studies (e.g., DNA fingerprinting) for paternity investigations and island/atoll population relatedness and for mark/recapture work.
 - R S 2.4 Develop estimates of age-specific survivorship / mortality schedules from the study of marked animals (resighting histories).
 - R S 2.5 Develop estimates of age-specific reproduction (female pupping rates).

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- R S 2.6 Compare life history parameters between and among separate island/atoll populations
- R S 2.7 Determine rates and degree of exchange (immigration and emigration) between island/atoll groups.
- R C/S 2.8 Establish a computerized data base for demographic, population and behavior data.
- R C/S 2.9 Organization, inventory and analysis of existing data on monk seal population size, life history parameters, movements, and behavior.
- R C 2.10 Develop a quantitative population model for the Hawaiian monk seal. This would require the inventory, organization and analysis the life history information collected to date, the identification of gaps in the life history data and identification of future research needs.
- R C 2.11 Use mark-and-recapture techniques to develop alternative estimates of monk seal abundance.
- 3. Identification of habitat requirements and areas of special biological importance.
- R C 3.1 Identification of prey species from scat and spew samples.
- R S 3.2 Determine and monitor changes in primary haul-out pupping and breeding areas.
- R C 3.3 Conduct energetic studies including rates of growth and physiology.
- R C 3.4 Study "at-sea" movements and foraging behavior via radio-telemetry.
- 4. Document effects of human disturbance.
- C 4.1 Place observers on fishing vessels to determine the frequency and nature of interactions with monk seals.
- S 4.2 Continuation of beach patrols and associated enforcement actions on islands and atolls.
- 5. Management actions.
- S 5.1 Review and revise the 1980 disaster Contingency Response Plan.

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- M S 5.3 Continue to work with Coast Guard to reduce human disturbance on Kure Atoll.
- M S 5.4 Require that fisheries management programs provide for assessing and mitigating both direct and indirect effects of fisheries interactions.
- M S 5.5 Consider reestablishment of monk seal populations on Midway Island.
- M C/S 6. Educational and interpretive program.
- M C/S 6.1 Develop a program to educate the public on the general life history of the monk seal, its threats and efforts to manage the recovery of the species.
- M C/S 6.2 Evaluate the effectiveness of education/interpretive programs.

Appendix C

9/90

MARINE MAMMALS AND ENDANGERED SPECIES PROGRAM
Southwest Fisheries Science Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96822-2396
HAWAIIAN MONK SEAL
REPORTS AND PUBLICATIONS OF PROGRAM AND COLLABORATING
SCIENTISTS (1981-1989)

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